

CLAIMS

- 1 A process for the production of a photocatalytically active coated substrate which comprises depositing a titanium oxide coating on the surface of a substrate by contacting the surface of the substrate with a fluid mixture containing a source of titanium and a source of oxygen, said substrate being at a temperature of at least 600°C, whereby the coated surface of the substrate has a photocatalytic activity of greater than $5 \times 10^{-3} \text{ cm}^{-1} \text{ min}^{-1}$ and a visible light reflection measured on the coated side of 35% or lower.
- 2 A process as claimed in claim 1 wherein the substrate is at a temperature in the range 625°C to 720°C.
- 3 A process as claimed in claim 2 wherein the substrate is at a temperature in the range 645°C to 720°C.
- 4 A process as claimed in claim 1 wherein the fluid mixture comprises titanium chloride as the source of titanium and an ester other than a methyl ester.
- 5 A process for the production of a photocatalytically active coated substrate which comprises depositing a titanium oxide coating having a thickness of less than 40 nm on a substrate by contacting a surface of the substrate with a fluid mixture comprising titanium chloride and an ester other than a methyl ester.
- 6 A process as claimed in claim 5 wherein the surface of the substrate is contacted with the fluid mixture when the substrate is at a temperature in the range 600°C to 750°C.
- 7 A process as claimed in claim 5 wherein the ester comprises an alkyl ester having an alkyl group with a β hydrogen.
- 8 A process as claimed in claim 5 wherein the ester comprises a carboxylate ester.

- 9 A process as claimed in claim 5 wherein the ester is an alkyl ester having a C₂ to C₄ alkyl group.
- 10 A process as claimed in claim 9 wherein the ester comprises an ethyl ester.
- 11 A process as claimed in claim 10 wherein the ester comprises ethyl acetate.
- 12 A process as claimed in claim 5 wherein the ester is the only source of oxygen in the fluid mixture.
- 13 A process as claimed in claim 1 wherein the fluid mixture is a gaseous mixture.
- 14 A process as claimed in claim 1 wherein the process is performed on-line during the float glass production process and the substrate is a glass ribbon.
- 15 A process as claimed in claim 14 wherein the process is performed in the float bath.
- 16 A process as claimed in claim 1 wherein the process is performed at substantially atmospheric pressure.
- 17 A process for the production of a durable photocatalytically active coated glass which comprises depositing on the surface of a glass substrate a photocatalytically active titanium oxide layer by contacting the surface of the substrate, which is at a temperature in the range 645°C to 720°C, with a fluid mixture containing a source of titanium.
- 18 A photocatalytically active coated substrate comprising a substrate having a photocatalytically active titanium oxide coating on one surface thereof, characterised in that the coated surface of the substrate has a photocatalytic activity of greater than $5 \times 10^{-3} \text{ cm}^{-1} \text{ min}^{-1}$ and in that the coated substrate has a visible light reflection measured on the coated side of 35% or lower.

- 19 A photocatalytically active coated substrate as claimed in claim 18 wherein the coated surface of the substrate has a photocatalytic activity of greater than $1 \times 10^{-2} \text{ cm}^{-1} \text{ min}^{-1}$.
- 20 A photocatalytically active coated substrate as claimed in claim 19 wherein the coated surface of the substrate has a photocatalytic activity of greater than $3 \times 10^{-2} \text{ cm}^{-1} \text{ min}^{-1}$.
- 21 A photocatalytically active coated substrate as claimed in claim 18 wherein the coated substrate has a visible light reflection measured on the coated side of 20% or lower.
- 22 A photocatalytically active coated substrate as claimed in claim 21 wherein the coated substrate has a visible light reflection measured on the coated side of 15% or lower.
- 23 A photocatalytically active coated substrate as claimed in claim 18 wherein the substrate comprises a glass substrate.
- 24 A photocatalytically active coated substrate as claimed in claim 18 wherein the coated substrate has an alkali metal ion blocking under layer between the surface of the substrate and the photocatalytically active titanium oxide coating.
- 25 A photocatalytically active coated substrate as claimed in claim 24 wherein the alkali metal ion blocking layer is a layer of silicon oxide.
- 26 A photocatalytically active coated substrate as claimed in claim 18 wherein the photocatalytically active titanium oxide coating has a thickness of 30 nm or lower.
- 27 A photocatalytically active coated substrate as claimed in claim 26 wherein the photocatalytically active titanium oxide coating has a thickness of 20 nm or lower.

- 28 A photocatalytically active coated substrate as claimed in claim 27 wherein the photocatalytically active titanium oxide coating has a thickness in the range 2 nm to 20 nm.
- 29 A photocatalytically active coated substrate as claimed in claim 18 wherein the coated surface of the substrate has a static water contact angle of 20° or lower.
- 30 A photocatalytically active coated substrate as claimed in claim 18 wherein the coated substrate has a haze of less than 1%.
- 31 A photocatalytically active coated substrate as claimed in claim 18 produced by a process as claimed in claim 1.
- 32 A photocatalytically active coated substrate as claimed in claim 18 wherein the coated surface of the substrate is durable to abrasion, such that the coated surface remains photocatalytically active after it has been subjected to 300 strokes of the European standard abrasion test.
- 33 A photocatalytically active coated substrate as claimed in claim 32 wherein the coated surface remains photocatalytically active after it has been subjected to 500 strokes of the European standard abrasion test.
- 34 A photocatalytically active coated substrate as claimed in claim 33 wherein the coated surface remains photocatalytically active after it has been subjected to 1000 strokes of the European standard abrasion test.
- 35 A photocatalytically active coated substrate as claimed in claim 32 wherein the haze of the coated substrate is 2% or lower after being subjected to the European abrasion test.
- 36 A photocatalytically active coated substrate as claimed in claim 18 wherein the coated surface of the substrate is durable to humidity cycling such that the coated surface

remains photocatalytically active after the coated substrate has been subjected to 200 cycles of the humidity cycling test.

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A durable photocatalytically active coated glass comprising a glass substrate having a coating on one surface thereof, said coating comprising an alkali metal ion blocking underlayer and an outer photocatalytically active titanium oxide layer, wherein the coated surface of the substrate is durable to abrasion such that the coated surface remains photocatalytically active after it has been subjected to 300 strokes of the European standard abrasion test.

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A durable photocatalytically active coated glass as claimed in claim 37 wherein the coated glass has a visible light reflection measured on the coated side of 35% or lower, and wherein the photocatalytically active titanium oxide layer has a thickness of 30 nm or lower.

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A coated glass comprising a glass substrate having a photocatalytically active titanium oxide coating on one surface thereof, characterised in that the coated surface of the glass has a photocatalytic activity of greater than $8 \times 10^{-2} \text{cm}^{-1} \text{min}^{-1}$ and in that the coated glass has a visible light reflection measured on the coated side of less than 20%.

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A multiple glazing unit comprising a first glazing pane of a coated substrate as claimed in claim 18 in spaced, opposed relationship to a second glazing pane.

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Laminated glass comprising a first glass ply of a coated glass as claimed in claim 18, a polymer interlayer, and a second glass ply.

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